Consciousness as a Quantum State of Reality

Jordi Mas i Manjón, Ph.D

Abstract

This paper proposes a quantum model of consciousness, understood as a superposition of subjective perceptions of reality. Inspired by a previous mathematical model that describes consciousness as a dynamic interaction between individual information and social influence (see Appendix B), this quantum approach introduces the notion of mental states as wave functions evolving over time. Using tools from quantum mechanics, the interaction between the individual and their context is formalized as operators that affect the probability of adopting a given perception. Conditions are presented under which the quantum state collapses into a defined perception, analogous to the bifurcation described in the classical model. Finally, a hypothetical example based on social interaction questionnaires is analyzed, showing how consciousness can stabilize into a specific state following an observation.

1 Introduction

Consciousness has traditionally been addressed from philosophical and psychological perspectives, and more recently through applied mathematical models. In previous work, a system of differential equations was proposed to describe consciousness as a subjective reflection of reality, emerging from the interaction between the information held by an individual and the influence of their social environment. That model identified equilibrium and bifurcation conditions that help infer when consciousness manifests as a state change.

In this article, we extend that conceptualization into a quantum framework, where consciousness is represented as a wave function $\Psi(t)$ in a Hilbert space. Each basis state $|i\rangle$ corresponds to a possible perception of reality, and the evolution of the consciousness state is governed by the Schrödinger equation. This approach allows us to incorporate phenomena such as mental state superposition, cognitive interference, and collapse induced by internal or external observations.

As in the classical model, we introduce operators representing internal information and social influence, weighted by coefficients that reflect their relative importance. The probability of adopting a specific perception is calculated as the squared modulus of the projection of the state onto that basis. Finally, a hypothetical example illustrates how an observation—such as a reflective questionnaire—can induce the collapse of the quantum state into a defined perception,

analogous to the transition from an unstable to a stable focus in the previous model.

2 Quantum Model

We consider that an individual's consciousness is represented by a quantum state $|\Psi(t)\rangle$ in a Hilbert space $\mathcal{H}$, where each basis $|i\rangle$ represents a possible perception of reality.

The temporal evolution of the consciousness state is governed by the Schrödinger equation:

$$i\hbar \frac{d}{dt} |\Psi(t)\rangle = \hat{H} |\Psi(t)\rangle \tag{1}$$

where $\hat{H}$ is the Hamiltonian operator describing internal (individual information) and external (social interaction) influences.

We propose the following simplified Hamiltonian:

$$\hat{H} = \alpha \hat{I} + \beta \hat{S} \tag{2}$$

where:

- $\hat{I}$ represents the operator of internal information.
- $\hat{S}$ represents the operator of social influence.
- α and β are coefficients weighting the relative importance of each component.

The probability that the individual perceives reality as state $|i\rangle$ at time t is given by:

$$P_i(t) = |\langle i|\Psi(t)|i|\Psi(t)\rangle|^2 \tag{3}$$

The collapse of the consciousness state occurs when an observation (external or internal) projects the state $|\Psi(t)\rangle$ onto a defined basis $|i\rangle$:

$$|\Psi(t)\rangle \to |i\rangle \tag{4}$$

3 Appendix A: Hypothetical Quantum Example

Let us suppose a system with three possible perceptions of reality: $|A\rangle$ (optimism), $|B\rangle$ (neutrality), $|C\rangle$ (pessimism). The individual's initial state is:

$$|\Psi(0)\rangle = \frac{1}{\sqrt{3}} (|A\rangle + |B\rangle + |C\rangle) \tag{5}$$

We assign hypothetical values:

$$\alpha = 1, \quad \beta = 2 \tag{6}$$

$$\hat{I} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0.5 & 0 \\ 0 & 0 & 0.2 \end{pmatrix}, \tag{7}$$

$$\hat{S} = \begin{pmatrix} 0.3 & 0.1 & 0.2 \\ 0.1 & 0.4 & 0.1 \\ 0.2 & 0.1 & 0.3 \end{pmatrix} \tag{8}$$

We compute the Hamiltonian:

$$\hat{H} = \alpha \hat{I} + \beta \hat{S} \tag{9}$$

The evolution of the state $|\Psi(t)\rangle$ is obtained by solving the Schrödinger equation numerically. After a social observation (e.g., a reflective questionnaire), the state collapses to:

$$|\Psi(t)\rangle \to |B\rangle \tag{10}$$

indicating that the individual adopts a neutral perception of reality.

4 Appendix B: Classical Mathematical Model of Consciousness

We consider the following system of differential equations:

$$\begin{cases} \dfrac{dx}{dt} = x_1 - x_2 xy + x_3 xy^2, \\ \dfrac{dy}{dt} = B_1 - B_2 xy \end{cases} \tag{11}$$

Here, x represents the individual's information, and $y(t)$ the individuals with whom x interacts. B_1 is the growth of y in x's observational sphere, $x_1 y$ is the impression of x per unit time, $x_3 xy^2$ is the impression caused by the organization and plans of y, and $-x_2 xy$, $-B_2 xy$ are exchange terms. The value $C = x_2/B_2$ estimates the social value of y before x's judgment—interpreted as x's consciousness within society.

Equilibrium positions:

$$x = \frac{x_1 B_2 + x_3 B_1}{x_2 B_2}, \quad y = \frac{B_1 x_2}{x_1 B_2 + x_3 B_1} \tag{12}$$

Magnitudes:

$$\sigma = -x_2 y + x_3 y^2 - B_2 x, \quad \Delta = x_2 B_2 xy - x_3 B_2 xy^2 \tag{13}$$

Consciousness value:

$$C = \frac{x_2}{B_2} = \frac{y(x_1 + x_3 xy)}{B_1} \tag{14}$$

Consciousness C manifests when:

$$x_3 y^2 < B_2 x + x_2 y \tag{15}$$

5 References

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